

REMARKS

The application has been amended and is believed to be in condition for allowance.

Claims 1-20 are pending with claims 1, 12, and 18 being independent.

Applicants acknowledge with appreciation that the Official Action indicated that claims 4, 9, 17, and 20 are directed to allowable subject matter.

There are no other formal matters outstanding.

Claims 1-3, 5-8, and 10-14 are rejected as obvious over Japanese Published Patent Application JP 2000-70635 (Reference 1) in view of Japanese Published Patent Application JP 63-14886 (Reference 2).

Claims 15-16 stand rejected as obvious over Reference 1 and Reference 2 taken together in further view of BOWSER et al., 5,019,140.

Claim 1 recites the present invention, which is an air filter comprising a first filter layer and an independent second, downstream filter layer. The first filter layer is formed of a first filter paper material having a predetermined density and being impregnated with oil. The second filter layer (provided on a downstream side of the first filter layer) is formed of a

second filter paper material having a lower density and is impregnated over its entirety with an oil-repellent agent.

Reference 1 discloses a first filter layer 11 impregnated with oil, and a second filter layer 12 not impregnated with oil, a portion 11a of the first filter positioned on a downstream side thereof is impregnated with an oil-repellant agent. See Figures 2a-2b.

The densities of the first filter layer 11 and second filter layer 12 are disclosed at paragraph 0027 as "A value suitable for a pore size of a first filter layer (11) can be selected in accordance with property required for air filter, for example, the value is set between 80~150 μm . For the first filter layer (11), dust is trapped by meshes of filter, so dust is captured. Therefore, a value of pore size is set considering a diameter, press loss, and so on of dust to be captured."

At paragraph 0027, "[o]n the other hand, concerning the second filter layer (12) for which non-woven fabric or filter paper not impregnated with oil is used, a pore size is set, from example, between 80~200 μm . Thus, the non-woven fabric or filter paper with large meshes, i.e., a relatively big size of pore is used for the second filter layer (12). This is because carbon dust is captured by contact filtering, and it is not necessary to make the mesh of the second filter small."

From these two paragraphs of Reference 1, one of skill understands that while the density of the first filter layer 11 (impregnated with oil) is high, the density of the second filter layer 12 (not impregnated with oil) is low.

On page 2 of the Official Action, it is acknowledged that Reference 2 teaches a filter of a single paper, the single paper having a density gradient. The Official Action "separates" the single paper into two layers, the first layer having a higher density than the second layer. This is said to suggest that the layers of the Reference 1 filter can be formed with a first layer having a higher density than the second layer. However, this is directly contrary to the explicit teachings of paragraphs 27-28 discussed above. Therefore, this modification of Reference 1 is not viable.

Now, turning attention to the first filter layer 11, referring to Reference 1 Figures 2a-2b, in that air filter, the oil-repellant agent layer is formed in the downstream portion of the high density layer 11 so that the capture of a small amount of carbon will cause a clogging of the filter. Even if the high density layer 11 is split into two layers, the teaching of Reference 1 is to use the oil-repellant layer in the high density layer material. Thus, both layers would be of the same density

and clogging occurs with only a small amount of carbon being captured.

In contrast, the present invention uses oil-repellant agent layer in the entirety of the low density layer, which allows a greater capture of carbon below clogging occurs.

Reference 2 fails to teach to use a low density layer for the oil-repellant agent layer.

See that Reference 2 Figure 1 discloses a water-repellent agent layer 3 and an oil-impregnated layer 2 having different pores rates so that a sort of density gradient is formed (page 2, column 3, lines 26-28). However, Reference 2 teaches that relatively fine dust is captured while it passes through the water-repellent agent layer 3 (layer 3 having relatively fine pores and forming a gradient relative to the oil-impregnated layer 2-page 2, column 3, lines 36-39).

Thus, water-repellent agent layer 3 has the higher density and oil-impregnated layer 2 has the lower density.

Therefore, the teaching of Reference 2 is to provide the water-repellent agent layer 3 with a higher density than the oil-impregnated layer 2. If this teaching is applied to Reference 1, layer 11a would be made of a higher density than the portion of layer 11 being oil-impregnated, and this is not the structure recited.

Thus, neither reference teaches that recited, taken individually or in any reasonable combination. Only the present invention teaches an air filter with the second filter layer, treated with oil-repellent agent, being a lower density than the first filter layer, treated with oil.

Independent claims 12 and 18 have similar recitations and are believed patentable, at least based on those similar recitations.

The dependent claims are believed allowable at least for depending from an allowable independent claim.

Therefore, reconsideration and allowance of all the pending claims are solicited.

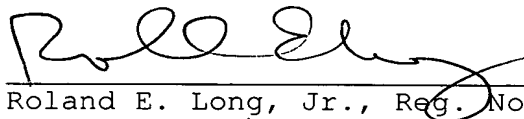
Applicants believe that the present application is in condition for allowance and an early indication of the same is respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any

overpayment to Deposit Account No. 25-0120 for any additional
fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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